Claims

1. A monitoring device for a space that is to be monitored for the entry of at least one body (1.4) via an access area (1.1) comprising at least one emitting element which introduces luminous radiation at least indirectly into the access area and at least one receiving element which receives the luminous radiation, characterized in that there is provided at least one means for producing a diffuse light field (4.3, 6.13) which emits the luminous radiation emitted into the access area (1.1) in the form of a planar light field, and in that at the receiving end there is provided a detecting element for diffusely detecting the light field and a transmitting means for transmitting the diffusely detected light to the receiving element.

2. A monitoring device in accordance with Claim 1, characterized in that there is associated with the emitting element at least one light guide (1.2) which comprises the means for producing the light field.

3. A monitoring device in accordance with Claim 1 or 2, characterized in that there is associated with the receiving element (1.3) at least one light guide (1.2) which acts simultaneously as the detecting element and the transmitting means.

4. A monitoring device in accordance with Claim 1 or 2, characterized in that the emitting light guide (2.2) associated with the emitting element and/or the receiving light guide (4.2) associated with the receiving element comprises a structure (2.3) for respectively radiating or receiving the light field (4.3, 6.13) in a direction transverse to the longitudinal direction of the light guide.

5. A monitoring device in accordance with Claim 4, characterized in that the structure (2.3) is a lasered structure consisting of small lasered points with rounded indentations.

6. A monitoring device in accordance with Claim 4 or 5, characterized in that the reflective and/or injection molded and/or lasered structure (2.3) is provided to be argumented with increasing distance from the emitting element.

7. A monitoring device in accordance with any of the preceding Claims, characterized in that the means for producing the light field (4.3, 6.13) are arranged in such a manner that the luminous radiation is radiated at least partially with a component that is radial and axial in regard to the light guide.

8. A monitoring device in accordance with any of the preceding Claims, characterized in that for each light field there is provided a single emitting element, preferably a light emitting LED (2.1) which irradiates light into the emitting light guide (2.2) and a single receiver, preferably a photodiode (6.8), which receives the light from the receiving light guide (4.2).

9. A monitoring device in accordance with any of the preceding Claims, characterized in that there is provided an evaluating unit (6.38) which evaluates the shadowing of the light field in the direction of the receiving light guide that occurs upon the entry or passage of a body (1.4) into or through the light field (4.3, 6.13).

10. A monitoring device in accordance with any of the preceding Claims, characterized in that at least two light fields (4.3, 6.13) which are preferably evaluated separately by an evaluating unit (6.38) are arranged one behind the other in the direction of motion of the body (1.4).

11. A monitoring device in accordance with Claim 10, characterized in that the means for producing the light field, the emitting light guide and the receiving light guide for the two preferably mutually parallel light fields (4.3, 6.13) are arranged next to one another.

12. A monitoring device in accordance with either of the Claims 10 or 11, characterized in that the light fields are subdivided into a plurality of partial light fields

which are arranged one above the other and are evaluated separately by the evaluating unit (6.38).

13. A monitoring device in accordance with any of the Claims 10 to 12, characterized in that, when using a plurality of mutually neighboring light fields (4.3, 6.13), means are provided for preventing cross-talk.

14. A monitoring device in accordance with any of the preceding Claims, characterized in that there are provided in the access area (1.1) at least two light field regions that are arranged at an angle to one another.

15. A monitoring device in accordance with Claim 14, characterized in that each light field region comprises at least two light fields (16.13, 16.14, 16.15, 16.16) which are arranged one behind the other in the direction of motion of the body and/or at least two light fields (16.13, 16.14, 16.15, 16.16) which are arranged one above the other.

16. A monitoring device in accordance with either of the Claims 14 or 15, characterized in that the light field regions cross in the access area (1.1).

17. A monitoring device in accordance with any of the preceding Claims, characterized in that detection means are provided which detect the entry or the passage of a body (1.4) as soon as the total luminous power (7.1) falls below a predefined or predefinable threshold value (7.6, 18.5).

18. A monitoring device in accordance with Claim 17, characterized in that the threshold value (7.6, 18.5) is fixed or dynamically controlled.

19. A monitoring device in accordance with any of the preceding Claims, characterized in that the timing waveform of the shadowing process corresponding to a reduction of the total luminous power (7.1) reproduces the profile of the body (1.4) crossing the access area (1.1).

20. A monitoring device in accordance with any of the preceding Claims, characterized in that comparison means are provided for the temporal correlation of the falling below a threshold value and/or the total luminous power (7.1) of mutually associated light fields.

21. A monitoring device in accordance with any of the preceding Claims, characterized in that a counter is provided for determining the bodies (1.4) crossing the access area (1.1), said counter registering the maximum values of the maximum shadowing effect detected by the detection means for each body (1.4).

22. A monitoring device in accordance with any of the preceding Claims, characterized in that a fluorescent coloring material is provided in the receiving light guide (4.2).

23. A method of monitoring an access area (1.1) to a space which is to be monitored for the entry of at least one body (1.4) by emitting luminous radiation by means of at least one emitting element which introduces luminous radiation at least indirectly into the access area and at least one receiving element which receives the luminous radiation,
characterized by the production of at least one planar light field which is emitted diffusely into the access area (1.1), diffuse detection of the light field at the receiving end and transmission of the diffusely detected light to the receiving element.

24. A method in accordance with Claim 23, characterized in that the emission and/or reception of the light field is effected by light guides which preferably comprise a reflective and/or injection molded and/or lasered structure (2.3) for the radiation or for the receiving of the light field (4.3, 6.13) so that the light field is radiated transversely to the longitudinal direction of the light guide.

25. A method in accordance with either of the Claims 23 or 24, characterized in that the luminous radiation for the light field is at least partially radiated with a component that is radial and axial in regard to the light guide.

26. A method in accordance with any of the Claims 23 to 25, characterized in that for each light field the luminous radiation is irradiated into an emitting light guide (2.2) by a single emitting element, preferably a light emitting LED (2.1) and is received from a receiving light guide (4.2) by a single receiver, preferably a photodiode (6.8).

27. A method in accordance with any of the Claims 23 to 26, characterized in that for the purposes of determining the entry or passage of a body (1.4) into or through the light field (4.3, 6.13), the shadowing of the light field in the direction of the receiving light guide is evaluated and an entry or a passage of a body (1.4) is detected as soon as the total luminous power (7.1) falls below a predefined or predefinable threshold value (7.6, 18.5).

28. A method in accordance with Claim 27, characterized in that the threshold value (7.6, 18.5) is fixed or dynamically controlled.

29. A method in accordance with any of the Claims 23 to 28, characterized by the arrangement of at least two light fields (4.3, 6.13) that are preferably separately evaluated by an evaluating unit (6.38) one behind the other in the direction of motion of the body (1.4) or one above the other, and temporal correlation of the falling below the threshold value and/or the total luminous power (7.1) of mutually associated light fields.

30. A method in accordance with any of the Claims 23 to 29, characterized in that, in the access area (1.1), at least two light field regions are irradiated into the access area at an angle to one another.

31. A method in accordance with Claim 30, characterized in that the light field regions cross in the access area (1.1).

32. A method in accordance with any of the Claims 23 to 31, characterized in that the timing waveform of the shadowing process corresponding to a reduction of the total luminous power (7.1) corresponds to the profile of the body (1.4) crossing the access area (1.1).

33. A method in accordance with any of the Claims 23 to 32, characterized by the registration of the number of maximum shadowing effects for determining the number of bodies (1.4).

34. A method in accordance with Claim 33, characterized in that, if at least one light field region detects a plurality of, e.g. two maximum shadow effects, a plurality of, e.g. two bodies are detected.